

REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the present amendment and following discussion is respectfully requested.

Claims 1-36 are pending. Claims 3-7, 12, 13, 21, and 22 are withdrawn by the outstanding Office Action. Claims 2-9, 11-15, and 17-30 are amended and new Claims 31-36 are added by the present amendment. No new matter is added.

In the outstanding Office Action, Claims 18, 24, and 27 were rejected under 35 U.S.C. §112, second paragraph; and Claims 1-30 were rejected under 35 U.S.C. §102(b) as anticipated by Yuan (U.S. Patent No. 3,936,013), or in the alternative, under 35 U.S.C. §103(a) as unpatentable over Yuan in view of ordinary skill in the art.

Claims 2-9, 11-15, and 17-30 are amended to recite "The aircraft."

With regard to the rejection of Claims 18, 24, and 27 under 35 U.S.C. §112, second paragraph, that rejection is respectfully traversed. It is respectfully submitted that a perturbation *is* an instability, as recited in Claims 18, 24, and 27. This instability excites an instability mode of the vortex, causing the vortex to be destroyed (only the vortex itself has "instability modes"). This terminology is described, for example, in the present specification at page 4, lines 10-24. Accordingly, it is respectfully submitted that Claims 18, 24, and 27 are in compliance with all requirements under 35 U.S.C. §112, second paragraph.

With regard to the rejection of Claims 1, 10, and 16 under 35 U.S.C. §102(b) as anticipated by Yuan, or in the alternative, under 35 U.S.C. §103(a) as unpatentable over Yuan, that rejection is respectfully traversed.

Amended Claim 1 recites an aircraft comprising:

a wing forming a vortex at a rear portion thereof by a merging of a first co-rotating eddy with a second co-rotating eddy; and

a perturbation device disposed adjacent an area of creation of the first co-rotating eddy, the perturbation device being configured to generate a periodic perturbation having a

wavelength configured to excite at least one instability mode of the first co-rotating eddy to accelerate a destruction of the vortex.

In contrast, Yuan describes an apparatus that includes a tube 21 extending from the tip of a wing 11 of an aircraft. Air is expelled from holes 31, 32 in the tube to counteract the creation of a vortex at the tip of the wing. Yuan does not teach that *any* instability mode of the vortex is excited by the air expelled from the tube 21. Instead, the apparatus of Yuan simply tries to “cancel out” the vortex by providing a flow of air of equal magnitude and in the opposite direction to the vortex. For example, Yuan describes making the largest holes in tube 21 nearest the wing tip and smaller holes along the tube 21 away from the wing tip, as the highest velocities of the vortex are in the center of the vortex.¹ Thus, Yuan fails to teach or suggest “the perturbation device being configured to generate a periodic *perturbation having a wavelength configured to excite at least one instability mode of the first eddy*,” as recited in independent Claim 1 (a similar feature is also recited in independent Claims 10 and 16).

The outstanding Office Action stated at page 5, lines 10-14 that “Yuan does not use applicant’s specific claim language (i.e. wavelengths, exciting, instability mode, etc.). Absent any convincing evidence to the contrary the examiner believes that vortex destruction devices that interact with eddy flows ‘excite the instability mode’ of the eddies and ‘accelerate the destruction of the resulting vortex.’” Thus, the outstanding Office Action apparently asserts that the claimed invention is inherently taught by Yuan, but not only fails to offer the required evidence proving this assertion, but implies that it is the applicant’s burden to prove otherwise, contrary to well settled case law. In this respect, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28

¹See Yuan, column 4, lines 19-35.

USPQ2d 1955, 1957 (Fed. Cir. 1993) "*To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.*" Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (Emphasis added). See also MPEP §2112. The outstanding Office Action has not provided any extrinsic evidence that the device described by Yuan *necessarily* excites an instability mode of a vortex as recited in Claims 1, 10, or 16. In fact, as noted above, Yuan does not appear to excite any instability modes of a vortex, it simply attempts to cancel out the vortex by providing an air stream of equal magnitude as the vortex but in the opposite direction.

The outstanding Office Action cited Bilanin et al. (U.S. Patent No. 6,042,059) and Ortega et al. ("Wake Alleviation Properties of Triangular-Flapped Wings") for the proposition that "it is old and well known in the art ... that the destruction of vortices is 'enhanced by introducing time-varying disturbances' which 'excite the instabilities' associated with an eddy." However, it is initially noted that Ortega et al. was published in April 2002, after the effective filing date of the present application, February 25, 2002. Further, the Bristol et al. paper also referred to in the outstanding Office Action² was not published yet as of April 2002. Accordingly, Ortega et al. and Bristol et al. are not prior art with respect to the present application, and cannot be used as evidence that the claimed invention is unpatentable under 35 U.S.C. §§102 or 103.

With regard to Bilanin et al., this reference describes structures that passively create wake structures. There is no discussion of the use of an air jet expelled from a wing tip from a tube, much less that such an air jet would *necessarily* excite an instability mode of a vortex

²See the outstanding Office Action at page 6, line 6.

as recited in Claims 1, 10, or 16. Accordingly, the required showing of extrinsic evidence that makes clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill has not been made. Thus, Yuan does not inherently teach or suggest “a perturbation device” as recited in independent Claim 1.

With regard to the statement in the outstanding Office Action that “should Yuan not necessarily teach such a step, or ‘structure limitation’, such would be obvious to one having ordinary skill in the art (ordinary skill is evidenced by both Ortega and Bilanin et al teachings) to design the jet such that it is configured for generating a wavelength capable of exciting at least one instability mode of a co-rotating eddy to accelerate the destruction of the vortex for the purpose of reducing the kinetic energy (turbulence) of a vortex.” This statement is also contrary to well settled case law which holds that to establish *prima facie* obviousness of a claimed invention, ***all the claim limitations must be taught or suggested by the prior art.*** *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). (Emphasis added). Further, “***All words in a claim*** must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). (Emphasis added). See MPEP §2143.03. In the present case, Yuan does not teach, explicitly or inherently, the perturbation device as defined in Claim 1 which is configured to generate a periodic perturbation having a wavelength configured to excite at least one instability mode of the first co-rotating eddy to accelerate a destruction of the vortex. As no other reference has been cited as teaching such a device, a *prima face* case of obviousness has not been made with respect to Claim 1.

Consequently, as Yuan does not teach or suggest, either explicitly or inherently, the perturbation device as defined in Claim 1, Claim 1 is not inherently or explicitly anticipated by Yuan, or unpatentable over Yuan. As Claims 10 and 16 recite similar subject matter to

Claim 1, Claims 1, 10, and 16 (and Claims 2-9, 11-15, and 17-36 dependent therefrom) are patentable over Yuan.

New Claims 31-36 are supported at least by the specification at page 14, lines 11-18 and Figure 3. New Claims 31-36 depend from Claims 1 and 10, and thus are patentable for at least the reasons described above. In addition, Claims 31-36 recite subject matter that further defines over Yuan.

Claim 31 recites “the perturbation device is disposed completely within one of the wing and the flap of the aircraft.” As Yuan describes that tube 21 extends outside of wing 11, Claim 31 further patentable defines over Yuan. (Claim 34 recites similar subject matter.)

Claim 32 recites “the perturbation device is configured to eject a fluid through an aperture in one of the wing and the flap.” Again, as Yuan describes that tube 21 extends outside of wing 11, Claim 32 further patentable defines over Yuan. (Claim 35 recites similar subject matter.)

Claim 33 recites “the perturbation device is configured to eject a fluid at a velocity equal to or greater than a velocity of the aircraft.” As Yuan also fails to teach or suggest this feature, Claim 33 further patentable defines over Yuan. (Claim 36 recites similar subject matter.)

Finally, withdrawn Claims 3-7, 21, and 22 depend from generic Claim 1, which is believed to be patentable as discussed above. Accordingly, the rejoinder and allowance of Claims 3-7, 21, and 22 is respectfully requested. Withdrawn Claims 12 and 13 depend from generic Claim 10 which is also believed to be patentable as discussed above. Accordingly, the rejoinder and allowance of Claims 12 and 13 is also respectfully requested.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in

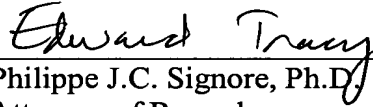
Application No. 10/717,672
Reply to Office Action of February 7, 2006

condition for formal Allowance. A Notice of Allowance for Claims 1-36 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

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